Real-time, context-aware anticipatory search

Mobile Voice Conference
San Francisco, April 15, 2013

Marsal Gavalda
marsal@expectlabs.com

Expect Labs
I get asked what the next big thing is a lot. I haven't had a good answer in a while. [...] Lately, though, there's one big concept that seems really exciting, and that's anticipatory systems.”

Owen Thomas
ReadWrite
My vision of search engines is that they won’t wait to be asked questions. They'll be listening in on our conversations –what we say, what we write, what we read, what we hear– and they will anticipate our needs.”

Ray Kurzweil
Google
I’ll meet you at Tony’s Pizza in five minutes.
Enabling trends for anticipatory search

Mobile devices are powerful and ubiquitous.

They capture, compute, transmit/receive, and present information.

Artificial intelligence is slowly but inexorably progressing.

Cloud-based backend applies ASR, NLP, ML, etc. to make sense of user context and intent.

Applications can anticipate user’s informational needs.

Aware of situational context and real-time updates, a new class of anticipatory computing apps can begin to make accurate predictions of what information will be most useful to the user at any given time.
Mobile devices are ubiquitous

Countries with Greatest Number of Active iOS & Android Devices (millions)

- US: 181
- China: 167
- UK: 35
- Japan: 28
- S. Korea: 27
- Germany: 22
- France: 19
- Canada: 19
- Brazil: 14
- Spain: 14

Source: Flurry Analytics, Active Devices during October 2012

Fastest Growing iOS & Android Markets by Active Devices

- China: 293%
- Vietnam: 269%
- Colombia: 260%
- Chile: 235%
- Ukraine: 209%
- Venezuela: 202%
- Turkey: 197%
- Philippines: 181%
- Egypt: 180%
- Russia: 180%


Countries with Highest Penetration Among Adults, 15 – 64 years old

- Singapore: 92%
- Hong Kong: 87%
- Sweden: 86%
- Australia: 79%
- US: 78%
- S. Korea: 76%
- Switzerland: 75%
- Denmark: 74%
- UK: 74%
- Norway: 74%

Source: Flurry Analytics, Active Devices during July 2012 versus Adult Population, 15 – 64 years old, per country
Mobile devices capture data via many sensors

Cameras, microphone, WiFi, LTE, GPS, and...

Hidden Innovation in the GALAXY S4

GALAXY S4 gets you closer to what matters in life, bringing your world together

- Gesture Sensor: Recognizes the user’s hand movements using infrared rays - Air Gesture
- Proximity Sensor: Recognizes whether the mobile phone is located near the user by using infrared rays - Direct Call
- Gyro Sensor: Detects the mobile phone rotation state based on three axes - Smart Rotation
- Accelerometer: Detects the mobile phone movement state based on three axes - S Health: Walking Mate
- Geomagnetic Sensor: Detects magnetic field intensity based on three axes - Digital Compass MAP
- Temperature/Humidity Sensor: Checks temperature and humidity levels - S Health: Comfort Level
- Hall Sensor: Recognizes whether the cover is open or closed - S View Cover
- Barometer: Identifies the atmospheric pressure at the user’s current location - S Health: Walking Mate
- RGB Light Sensor: Measures the red, green, blue, and white intensity of the light source - Samsung Adapt Display

Source: Samsung
Context is key to understand intent

Natural language is ambiguous without context, e.g.,

“I saw the man on the hill with the telescope”
Progress in...

Automatic Speech Recognition
- Dynamic speaker adaptation
- Deep/recurrent neural networks
- Ultra large language models

Natural Language Processing
- Conversation and topic modeling
- Knowledge Graph
  - 570 million entities
  - 18 billion facts & relationships

Machine Learning
- Latent factor models for recommender systems

...lead to improved understanding of natural, human-to-human conversations.
Expect Labs is building a new type of search platform to power this emerging class of anticipatory computing applications.

1. Passively analyze multiple concurrent data streams for each user in real-time (voice, GPS, video, updates, ...)

2. Generate a continuously changing model of user intent based on long-running context

3. Proactively find, correlate and rank relevant information display to user as appropriate
Our Anticipatory Computing Platform understands your conversation and finds the information you want before you need to ask.
MindMeld understands your conversation and automatically finds the information you want before you even ask for it.
MindMeld automatically finds relevant information

As you talk, MindMeld scours your social graph and the entire web for relevant information so that anything you may need is always at your fingertips.
MindMeld lets you share with a single swipe

If something catches your eye, simply slide it to the sharing panel, and everyone in your conversation can see it instantly.
MindMeld organizes and archives your thoughts

Everything you share is intuitively organized and archived in the cloud so you can access it anytime from anywhere.